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Operating Instructions

Electrical Glycol Heating for Tank Container

Content:

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1. General Description

1.1 Field of Application

The glycol heating which we have developed covers the requirements of approx. 90% of all container tank heating systems, since the temperature range of most heating media is 20°C to 90°C [120 °C]. The maximum contact temperature of tank wall to the product can never be higher than that of the flow temperature, which can be adjusted to 105°C [140°C] maximum.
The standard heating medium 60/40% water/glycol has an temperature operating range of -20 ...95°C [100% glycol max. operating range -5 …125°C].
The largest part of all container tanks which have more than 6 pipelegs, can be operated using our glycol heating system. Using a suitable arrangement of stop valves either steam or glycol operation is possible.
Continous maintenance is essentially important for proper and safe operation. Considering this advise can decrease running costs and improve durableness.

2. Design

The electrical glycol heating is a closed, practically non-pressurised heating system. The heat transfer medium is a water/glycol mixture [100% glycol].
Heater, pump and monitoring equipment are accommodated in a stainless steel housing mounted at the side on the container. The electrical control and regulating units are mounted in a supplementary, robust, splash-proof insulating housing.
The transparent plastic expansion tanks should be placed as high as possible, but at least above the highest steam pocket. Tank, brackets and retaining straps are supplied separately.
Depending on the actual construction, we provide various constructions and combinations:
The mains connection is effected via a cable TPR – F 4G4 mm² or H07 RN-F 4G4 for heavy duty with a CEE connector 5x32A,6h (4x32A,3h container version) or a wall mount CEE connector 5 x 32A/6h. The construction with 2350mm heater box- dimensions provide space for stowing mains cable inside.

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Feed and return flow have 32mm hose connections or ¾" inner thread screw connections for threaded sockets.

The circuit diagram consists of a durable self-adhesive plastic foil which is mounted in the housing lid.

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3. Mode of Operation

After starting up of the heating system, a stainless steel circulating pump maintains the glycol circulation.

Three thermostats provide safe temperature control.

1. Product thermostat S1

Electronic industrial controler with digital display.

Measuring input: resistant thermometer PT 100

Input range:0...+90°C [120°C]

Output: relay

The resistant thermometer could be mounted on the tank wall or put into a diving tube witch is placed in the product.

2. Flow thermostat S2

Electronic industrial controler with digital display.

Measuring input: resistant thermometer PT 100

Input range:0...+95°C [125°C]

Output: relay

3. Overheating thermostat S3A + S3B

Electronic temperature limiter 0..200°C, set to 105°C [140°C].

If the product temperature falls below the temperature set at the product thermostat, the heating switches on, and off again when the flow or product temperature is exceeded.

The continuous delivery by the recirculating pump prevents an accumulation of hot spots and ensures even heat distribution.

The overheating thermostat protects the system from overheating at 105°C [140°C], and is released via a reset key.

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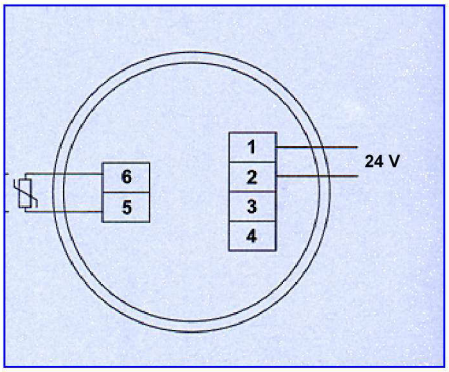
4. Service and Adjustment

S1 Product thermostat

S2 Flow thermostat

electronic industrial controler.

The controler is in normal operation mode for the user. The displays and control elements are shown below.



Setpoint adjustment

Pushing the SET-button, the display switches from current value to setpoint. To adjust setpoint, keep SET-button pressed and change setpoint with up- and down-button. After reaching new setpoint release buttons and new setpoint will be stored in non fluctuating memory. The up- down- button have to be realesed always first. This so called two-finger operation will avoid the user from changing setpoint uncontroled.

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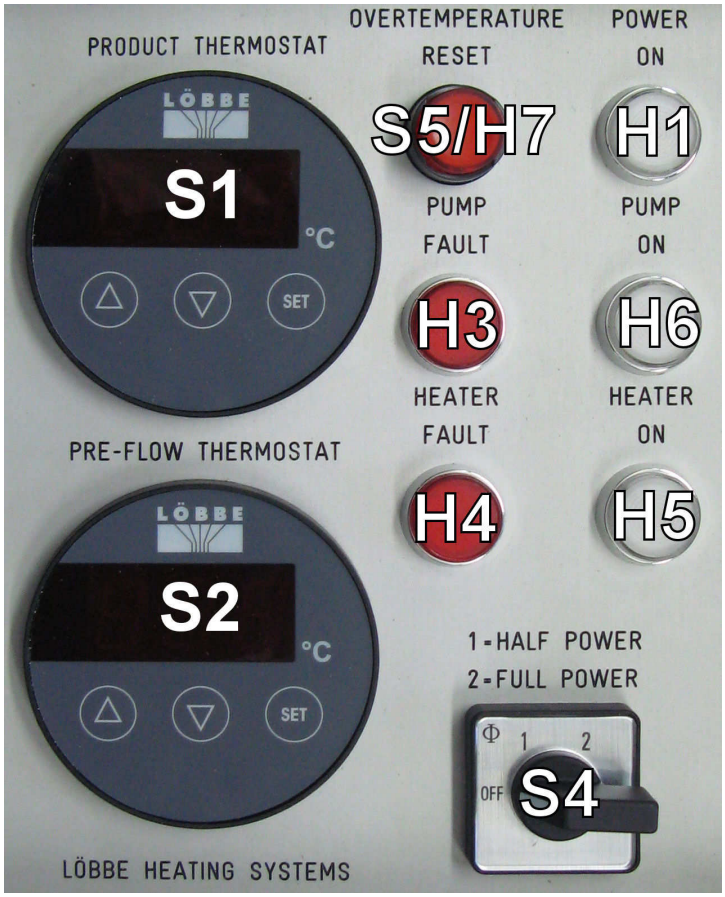
S3A + S3B Overheating thermostats:

Electronic temperature limiter with PT100. The sensor is attached inside the heater element, the thermostat is mounted below the transparent covering of the terminal box in the heater housing, set at 105°C [140°C] and must not be readjusted. If the temperature is reached, the heating incl. the pump shuts off. After elemination of the fault, witch causes the overheating, the heating unit can be restarted by pushing the reset button.

Operation messages and fault

H1 Signal light white
'Netz Ein' - 'POWER ON'
H5 Signal light white
'Heizung Ein' - 'HEATER ON'
H6 Signal light white
'Pumpe Ein' - 'PUMP ON'
S5/H7 Illuminated push button red
'Übertemp/Reset' - 'OVERTEMP/RESET'
H4 Signal light red
'Störung Heizstab' - 'HEATER FAULT'
H3 Signal light red
'Störung Pumpe' - 'PUMP FAULT'
S1 Temperature controller
'Produkt' - 'Product Thermostat'
S2 Temperature controller
'Vorlauf' - 'Preflow Thermostat'



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4.1 Initial Operation

Prior to the initial operation, the system must be filled with glycol (mono- or 1,2 polypropylene-glycol). This is achieved by removing the blanking plug at the expansion tank and by filling the system, using a 3-way ball valve, until the fluid becomes visible in the expansion tank.
Prior to switching the heating on, the product thermostat **S1** should be set to its minimum value and then the heater off-on switch **S4** switched on, so that the recirculating pump vents the system without switching on the heating element and so avoid overheating.
If necessary top up with fluid during venting. Lift container at least 3 to 4 times at the front and back by about 30 cm, so that the air can escape from the steam halves of the tubes.
Refit the blanking plug.

4.2 Heating Operation

4.2.1 Check heating fluid in expansion vessel ! (must be visible !).

4.2.2 Set product-thermostat **S1** to required product temperature.

4.2.3 Set flow-thermostat **S2** at least 10°C higher than product-thermostat.

4.2.4 Plug in CEE-connector plug. The control light **H1** ‘power on’ must illuminate.

4.2.5 Switch on switch **S4** ‘Heizung Aus-Halbe-Volle Leistung’ (‘heating off-half-fullpower’). The control light **H6** ‘Pumpe Ein’ (‘PUMP ON’) illuminate, the recirculating pump run.

4.2.6 If the product temperature is lower than the temperature set at the product-thermostat **S1**, the heating switches on, the control light **H5** ‘Heizung Ein’ (‘HEATER ON’) must illuminate.

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5. Fault Diagnosis

Warning! Remove mains plug prior to opening the electrical switch box!

5.1 Control light **H1** 'POWER ON' does not illuminate:

- Test whether CEE-connector plug is correctly plugged in.
- Test whether mains voltage is available.
- Test whether control fuses **F2-F4** are O.K., replacement fuses are located in the isolating lever.

5.2 Illuminated push button **S5/H7** 'Übertemperatur' ('OVERTEMPERATURE') illuminates:

- Limiter has switched.
- Proof heating fluid level in the expansion vessel. If necessary, fill up with glycol.
- Loose possibly blocked pump.

5.3 Control light **H3** 'Störung Pumpe' ('PUMP FAULT') illuminates:

- Motor protective switch **F5** has triggered. Loose possibly locked pump. Reconnect motor protective switch **F5** in on position.

5.4 Control light **H4** 'Störung Heizung' ('HEATER FAULT') illuminates:

- Power switch **1F1** or **1F2** has triggered.
- Check heating element and reset power switch **1F1** or **1F2**.

5.5 Control light **H5** 'Heizung Ein' ('HEATER ON') does not light up, although the product temperature is set lower than at the product-thermostat **S1**.

- Flow thermostat **S2** is set too low. Flow thermostat **S2** should be set approximately 10°C higher than product-thermostat **S1**.

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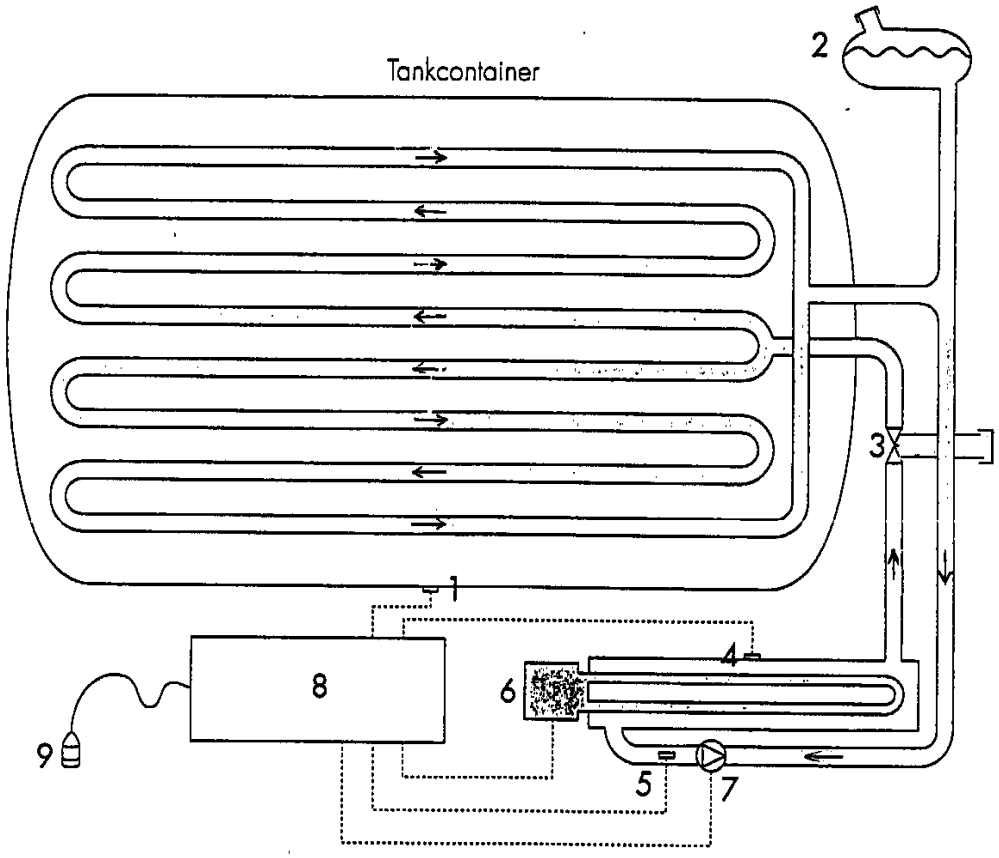
6. Diagrammatic Section



1 - Product - thermostat S1

2 - Expansion tank

3 - 3 -way valve

4 - Limiter S3A + S3B

5 - Flow - thermostat S2

6 - Heater

7 - Pump

8 - Electrical control unit

9 - Mains supply

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7. Technical Data

Dimensions:	L x W x H = 2350 x 285 x 200 mm (heater box)*
	L x W x H = 1950 x 280 x 200 mm (heater box)*
	L x W x H = 220 x 220 x 130 mm (control box)
Weight:	ap. 85 kg
Connecting voltage:	3 x 440 V, 60 Hz + 5%/-10%
	3 x 400 V, 50 Hz + 10%/-10%
	via CEE-connector 5 x 32 A,6h (4 x 32 A,3h)
Heating output:	12000 W at 440 V, 60 Hz half power
	19200 W at 440 V, 60 Hz full power
	9900 W at 400 V, 50 Hz half power
	15900 W at 400 V, 50 Hz full power
Recirculating pump:	195 W, ap. 0.9 A
Current consumption:	15,8 A at 440 V, 60 Hz half power
	25,2 A at 440 V, 60 Hz full power
	14,5A at 400 V, 50 Hz half power
	22,9 A at 400 V, 50 Hz full power
Glycol feed and return flow:	pipe sockets, ¾” inner thread

*depending on actual construction